

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation	7/30/2013 12:37:38 PM										
5	From File	WorkSheet.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10	DDx											
11												
12	General Statistics											
13	Total Number of Observations	65	Number of Distinct Observations	59								
14	Number of Detects	45	Number of Non-Detects	20								
15	Number of Distinct Detects	45	Number of Distinct Non-Detects	14								
16	Minimum Detect	0.2	Minimum Non-Detect	0.18								
17	Maximum Detect	3.41	Maximum Non-Detect	1.8								
18	Variance Detects	0.7	Percent Non-Detects	30.77%								
19	Mean Detects	1.852	SD Detects	0.837								
20	Median Detects	2.038	CV Detects	0.452								
21	Skewness Detects	-0.295	Kurtosis Detects	-0.861								
22	Mean of Logged Detects	0.46	SD of Logged Detects	0.654								
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic	0.956	Shapiro Wilk GOF Test									
26	5% Shapiro Wilk Critical Value	0.945	Detected Data appear Normal at 5% Significance Level									
27	Lilliefors Test Statistic	0.106	Lilliefors GOF Test									
28	5% Lilliefors Critical Value	0.132	Detected Data appear Normal at 5% Significance Level									
29	Detected Data appear Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	Mean	1.431	Standard Error of Mean	0.123								
33	SD	0.949	95% KM (BCA) UCL	1.629								
34	95% KM (t) UCL	1.636	95% KM (Percentile Bootstrap) UCL	1.628								
35	95% KM (z) UCL	1.633	95% KM Bootstrap t UCL	1.632								
36	90% KM Chebyshev UCL	1.799	95% KM Chebyshev UCL	1.966								
37	97.5% KM Chebyshev UCL	2.198	99% KM Chebyshev UCL	2.652								
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic	1.403	Anderson-Darling GOF Test									
41	5% A-D Critical Value	0.755	Detected Data Not Gamma Distributed at 5% Significance Level									
42	K-S Test Statistic	0.168	Kolmogrov-Smirnoff GOF									
43	5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level									
44	Detected Data Not Gamma Distributed at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)	3.351	k star (bias corrected MLE)	3.143								
48	Theta hat (MLE)	0.553	Theta star (bias corrected MLE)	0.589								
49	nu hat (MLE)	301.6	nu star (bias corrected)	282.9								
50	MLE Mean (bias corrected)	1.852	MLE Sd (bias corrected)	1.045								
51												
52	Gamma Kaplan-Meier (KM) Statistics											
53	k hat (KM)	2.278	nu hat (KM)	296.1								
54	Approximate Chi Square Value (296.08, α)	257.2	Adjusted Chi Square Value (296.08, β)	256.4								
55	5% Gamma Approximate KM-UCL (use when $n \geq 50$)	1.648	95% Gamma Adjusted KM-UCL (use when $n < 50$)	1.653								
56												
57	Gamma ROS Statistics using Imputed Non-Detects											
58	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
59	GROS may not be used when kstar of detected data is small such as < 0.1											
60	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
61	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
62	Minimum	0.2	Mean	1.511								

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63					Maximum	3.41					Median	1.164	
64					SD	0.871					CV	0.577	
65					k hat (MLE)	2.674					k star (bias corrected MLE)	2.561	
66					Theta hat (MLE)	0.565					Theta star (bias corrected MLE)	0.59	
67					nu hat (MLE)	347.6					nu star (bias corrected)	332.9	
68					MLE Mean (bias corrected)	1.511					MLE Sd (bias corrected)	0.944	
69											Adjusted Level of Significance (β)	0.0463	
70					Approximate Chi Square Value (332.93, α)	291.7					Adjusted Chi Square Value (332.93, β)	290.8	
71					95% Gamma Approximate UCL (use when $n \geq 50$)	1.724					95% Gamma Adjusted UCL (use when $n < 50$)	1.729	
72													
73	Lognormal GOF Test on Detected Observations Only												
74					Shapiro Wilk Test Statistic	0.846					Shapiro Wilk GOF Test		
75					5% Shapiro Wilk Critical Value	0.945					Detected Data Not Lognormal at 5% Significance Level		
76					Lilliefors Test Statistic	0.182					Lilliefors GOF Test		
77					5% Lilliefors Critical Value	0.132					Detected Data Not Lognormal at 5% Significance Level		
78	Detected Data Not Lognormal at 5% Significance Level												
79													
80	Lognormal ROS Statistics Using Imputed Non-Detects												
81					Mean in Original Scale	1.465					Mean in Log Scale	0.149	
82					SD in Original Scale	0.911					SD in Log Scale	0.733	
83					95% t UCL (assumes normality of ROS data)	1.654					95% Percentile Bootstrap UCL	1.65	
84					95% BCA Bootstrap UCL	1.654					95% Bootstrap t UCL	1.659	
85					95% H-UCL (Log ROS)	1.83							
86													
87	DL/2 Statistics												
88					DL/2 Normal						DL/2 Log-Transformed		
89					Mean in Original Scale	1.434					Mean in Log Scale	0.0811	
90					SD in Original Scale	0.942					SD in Log Scale	0.823	
91					95% t UCL (Assumes normality)	1.629					95% H-Stat UCL	1.891	
92	DL/2 is not a recommended method, provided for comparisons and historical reasons												
93													
94	Nonparametric Distribution Free UCL Statistics												
95	Detected Data appear Normal Distributed at 5% Significance Level												
96													
97	Suggested UCL to Use												
98					95% KM (t) UCL	1.636					95% KM (Percentile Bootstrap) UCL	1.628	
99													
100	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
101	Recommendations are based upon data size, data distribution, and skewness.												
102	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
103	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
104													